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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,064	01/26/2001	Richard A. Craig	E-1825 CIP	2684

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EXAMINER

PALABRICA, RICARDO J

ART UNIT	PAPER NUMBER
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3641

DATE MAILED: 07/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/771,064	CRAIG ET AL.
	Examiner	Art Unit
	Rick Palabrica	3641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 12 June 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-38 is/are pending in the application.
 - 4a) Of the above claim(s) 6, 10, 16-24 and 34-38 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5, 7-9, 11-15 and 25-33 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

1. Applicant's amendment in Paper No. 11, which is in response to Office Action dated February 12, 2003, is acknowledged. This amendment revised claims 1, 2 and 14, and added new claims 25-38.

As to the new claims in said amendment, claims 34-38 are directed to a process for detecting hydrogenous materials. Note that in Paper No. 5, applicant had elected without traverse the apparatus invention. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 34-38 are withdrawn from consideration as being directed to a nonelected invention. See 37 CFR 1.142(b) and MPEP 821.03.

2. In Paper No. 11, applicant traversed the use of Gomberg and Schultz et al. on the grounds that they are "directed to detection of heavier elements such as carbon, nitrogen and oxygen, and they fail to teach the requisite time delay and the neutron count-signal dependent on the amount of hydrogenous materials present in the target." The examiner disagrees because the features upon which the applicant relies do not serve to patently distinguish the claimed apparatus invention from the two cited prior art.

As to the matter of the limitation, "for detection of hydrogenous materials", which is recited in the preambles of amended claim 1 and new claim 25, this is a statement of intended use. The claims are to an apparatus and, as stated in the previous Office Action, this statement does not serve to patently distinguish the claimed structure over

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that of the reference (see pages 4 and 5 of previous Office Action). Additionally, Schultz et al. clearly disclose that their apparatus is capable of producing a hydrogen density image of an explosive-containing package, based on scattering of neutrons by hydrogen atoms within the package (e.g. see column 5, lines 26+ and claim 29).

As to the matter of "neutron count signal dependent on the amount of hydrogenous material", as recited in amended claim 1, this limitation pertains to the characteristics of material worked on by the apparatus, i.e., hydrogenous material in the target. As indicated on page 5 of the said Office Action, MPEP 2115 states that "inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims."

As to the matter of "time delay" in the counting, Gomberg clearly discloses that the operation of the neutron detectors is synchronized with the neutron bursts so that the detectors only sense neutrons produced by the burst and scattered from the target (see column 8, lines 10+, column 11, lines 15+ and column 12, lines 55+). Schultz et al. disclose that position sensitive detectors detect fast neutrons after they have interrogated the package to form a high-resolution hydrogen density (see column 3 lines 65+). Clearly, either one of Gomberg or Schultz et al. teaches an expedient to provide time delay. Additionally, the limitation regarding time delay is recited as a method limitation or statement of intended use in amended claim 1 and new claim 25. For example, claim 1 recites, "said timing circuit is operable to disable said neutron sensor during a time delay." Underlining provided. Furthermore, the applicant himself admits that the electronic circuitry to provide the necessary power, controls and time

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delay is "apparent to those in the art of electronic circuits" (see page 16, lines 25+ and page 20, lines 20+ of the specification). Thus, circuits to provide time delay in counting scattered neutron pulses are conventional.

As to the matter of a "time-tagged neutron source" either one of Gomberg or Schultz et al. disclose the use of such source. For example, Gomberg discloses that the sensitivity of his apparatus may be increased by operation in a pulsed or time of flight mode whereby neutron energy is directed to the target in short bursts (e.g., see column 12, lines 55 and Fig. 2). Similarly, Schultz et al. disclose the use of zetatron 14 MeV neutron generators operated in a 100 Hz pulsing mode (e.g. see column 6, lines 52+). The applicant himself admits that a neutron generator operated in a pulse mode is a "time-tagged neutron source" (see page 14 of the specification).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 25-33 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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New claim 25 recites the limitation, "wherein said control system is programmed to enable and disable said neutron sensor based on said timing signal to discriminate against detecting fast detectors that are not scattered from hydrogenous materials in the target." Underlining provided. The term "programmed" implies the application of a computer program or an algorithm to enable a control system function to be performed. There is neither an adequate description nor an enabling disclosure of this computer program or algorithm and its integration with the control system in the original specification.

4. Claims 25-33 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The reason is the same as in section 3 above.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by any one of Gomberg (U.S. 4,864,142), Schultz et al. (U.S. 5,200,626), or Givens (U.S. 3,688,117).

Anyone of the above references discloses an apparatus comprising a neutron source, a sensing head comprising a neutron sensor and a neutron shield, and a control system comprising a timing circuit. Any one of these references discloses a time-tagged neutron source providing fast neutrons directed toward a target and a portion of said neutrons is backscattered from the target to the neutron sensor. Anyone of the above references either discloses or inherently includes a cable to couple the neutron sensor to the control circuit, and such cable reads on claim language "extension arm" in claim 14.

The claims are replete with statements that are essentially method limitations or statements of intended or desired use. Examples include: "for detecting hydrogenous materials", "produces a neutron count signal dependent on the amount of hydrogenous material present in the target", etc. These clauses, as well as other statements of intended use do not serve to patently distinguish the claimed structure over that of the reference. See *In re Pearson*, 181 USPQ 641; *In re Yanush*, 177 USPQ 705; *In re Finsterwalder*, 168 USPQ 530; *In re Casey*, 152USPQ 235; *In re Otto*, 136 USPQ 458; *Ex parte Masham*, 2 USPQ 2nd 1647.

See also MPEP 2114 that states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647.

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531.

[A]pparatus claims cover what a device is, not what a device does."
Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

In any case, any one of the apparatus disclosed in the above references is capable of functioning in the same manner or for the same intended or desired use as the claimed invention. Note that it is only necessary that such capability be present. See also section 2 above.

5. Claim 3 is rejected under 35 U.S.C. 102(b) as being anticipated by Givens who discloses in his figure a pulse height analyzer (i.e., gated scaler 15) with pulse height discriminator 55.

6. Claims 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Gomberg. Applicant's claim language reads on the expedient employed by Gomberg for rejection of spurious signals, e.g., neutrons scattered by objects not under interrogation (see column 11, lines 32+).

7. Claims 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Schultz et al. who discloses helium-3 neutron detectors (see column 8, lines 60+).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 25-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Gomberg, who discloses the applicant's claims except for the control system being programmed to enable and disable a neutron sensor. He discloses in Fig. 2 the use a controller 34 for his apparatus. He further states that this controller can be a computer or microprocessor (see column 11, lines 62+). One having ordinary skill in the art would have recognized that the software in a computer or microprocessor can be programmed to enable an associated hardware (e.g., a control system) to perform a specific function. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Gomberg, to program the controller to enable and disable the neutron sensor based on a timing signal to discriminate against detecting fast neutrons that are not scattered from hydrogenous materials in the target, as well as enable the neutron sensor after a time delay during a window and to disable said sensor after said window, to gain the advantages thereof (i.e., more accurate results), because such modification is no more than the use of well-known expedients within the nuclear art.

Gomberg discloses an embodiment in Fig. 5 where his apparatus is mounted on a vehicle.

Similar to the discussion in section 5, the claims are replete with statements of intended or desired use that do not patently distinguish the claimed apparatus from the reference. These include, "for detecting hydrogenous materials" in claim 25 and "positioned to provide neutrons into the ground for detecting subterranean hydrogenous targets."

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Gomberg or Schultz et al., or Givens, as applied to claims 1, 2, 5, 14 and 15 above, and further in view of either the Applicant's own statement in the disclosure or Fenimore et al. (U.S. 4,209,780). Any one of Gomberg or Schultz et al., or Givens discloses the applicant's claim except for a coded-array aperture for the neutron sensor.

On page 7 lines 17+ of the specification, the applicant discloses that true imaging of neutrons can be achieved by a "coded-aperture camera using the techniques of Vanier and Forman." This statement implies that a coded array aperture for a neutron sensor is well known. In fact, other patents on thermal neutron detection make reference to the work Varnier et al. on thermal neutron imaging (e.g., see Ref. K). Therefore, claim 7 is obvious over any one of Gomberg or Schultz et al.

If the above obviousness is not evident then, Fenimore et al. teach the use of coded aperture imaging with neutron detectors in order to achieve high-resolution images (see column 1, lines 25+ and column 3, lines 45+). Therefore, it would have

been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by any one of Gomberg or Schultz et al., or Givens by the teaching of Fenimore et al., to include a coded-array aperture for the neutron sensor, to gain the advantages thereof (i.e., higher image resolution) because such modification is no more than the use of conventional designs/techniques within the nuclear art.

9. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomberg, as applied to claims 1, 2, 5, 14 and 15 above, and further in view of Uckan et al. (Nuclear Instruments and Methods in Physics Research, 1999, p.26-34). Gomberg discloses the applicant's claims except for the use of a californium-252 neutron source. Gomberg discloses that the sensitivity of his system can be increased by using neutrons sources operated in a time of flight mode (see column 12, lines 55+).

Uckan et al. disclose a californium-252 used as neutron source for time-of flight measurements. Both Gomberg and Uckan et al. disclose the use neutron sources for applications with time of flight counting modes. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Gomberg, by the teaching of Uckan et al. to include a californium-252 source in an ionization chamber, to gain the advantages thereof (i.e., greater sensitivity), because such modification is no more than the use of well-known expedients within the nuclear art, and the substitution of one neutron source by another well-known neutron source.

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10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over one of Gomberg, or Schultz et al., or Givens, as applied to claims 1, 2, 5, 14 and 15 above, and further in view of either one of Hahn (U.S. 3,577,158) or Buchanan (U.S. 5,083,029). Any one of Gomberg or Schultz et al., or Givens discloses the applicant's claims except for the use of a neutron shield comprising ^{10}B . Either one of Hahn or Buchanan teach a neutron shield comprising boron.

One having ordinary skill in the art would have recognized that all references are in the same field of endeavor and the teachings of Hahn or Buchanan would apply to the others. Note that the element boron disclosed in Hahn or Buchanan will inherently contain some ^{10}B isotope because this isotope is found in natural boron.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by any one of Gomberg or Schultz et al., or Givens, by the teachings of either one of Hahn or Buchanan, to include a neutron shield comprising a material containing ^{10}B , because such modification is no more than the use of conventional designs/techniques within the nuclear art, and the substitution of one neutron shield material by another well-known neutron shield material.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

12. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 7:00-4:30, Mon-Fri; 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

RJP
July 16, 2003

MICHAEL J. COOPER
SUPERVISORY PATENT EXAMINER